Title: Enhanced Triple-Helix and Double-Helix Formation with Oligomers Containing Fied Pyrmidines Inventor(s). Inlert, et al

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$$X^2 = CO$$
, CS or SO_2
 $X^3 = O$, S, CH_2 , CF_2 , CFH ,
 NH , NCH_3

Figure 1

Title: Enhanced Triple-Helix and Double-Helix Formation with Oligomers Conference Modified Pyrmidines Invel. (3): Froehlert, et al Attorney: Emma R. Dailey Phone No.: 215-568-3100 Sheet 2 of 29

Figure 2

Title: Enhanced Triple-Helix and Double-Helix Formation with Oligomers Containing and diffied Pyrmidines Inventor(s), roehlert, et al

Attorney: Emma R. Dailey Phone No.: 215-568-3100 Sheet 3 of 29

YOχ7. (14) (15) ΥÖ ΥÖ

Figure 3

Title: Enhanced Triple-Helix and Double-Helix Formation with Oligomers
Contact Modified Pyrmidines
Inventor: Froehlert, et al
Attorney: Emma R. Dailey Phone No.: 215-568-3100 Sheet 4 of 29

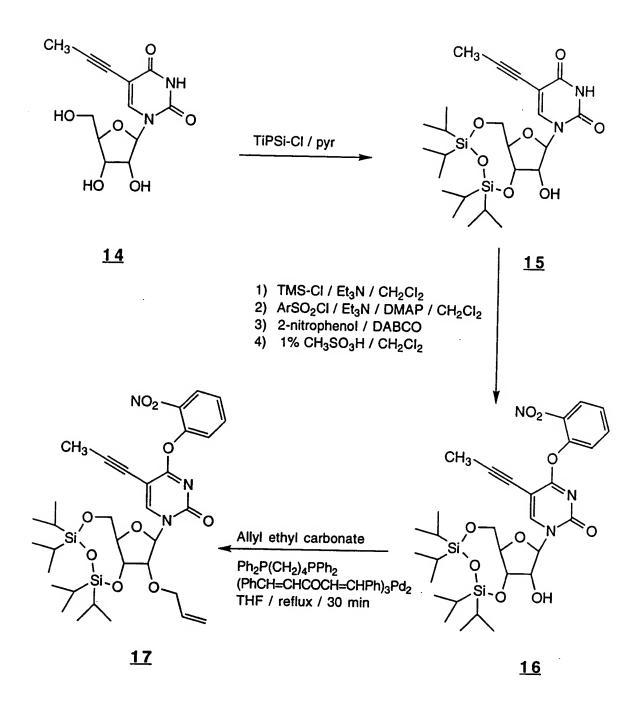


Figure 4-1

Title: Enhanced Triple-Helix and Double-Helix Formation with Oligomers
Contain Toddfied Pyrmidines
Inventor(s): Froehlert, et al
Attorney: Emma R. Dailey Phone No.: 215-568-3100 Sheet 5 of 29

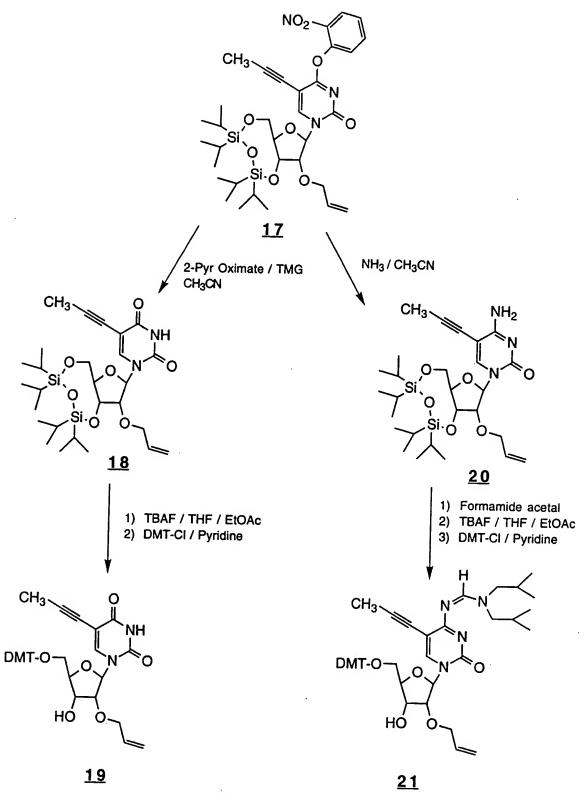


Figure 4-2

Title: Fnbanced Triple-Helix and Double-Helix Formation with Oligomers
Conta Modified Pyrmidines
Inventor (a): Froehlert, et al
Attorney: Emma R. Dailey Phone No.: 215-568-3100 Sheet 6 of 29

Figure 5-1

Title: Enhanced Triple-Helix and Double-Helix Formation with Oligomers
Containing diffied Pyrmidines
Inventor(s). Hoehlert, et al
Attorney: Emma R. Dailey Phone No.: 215-568-3100 Sheet 7 of 29

Figure 5-2

Title: Enhanced Triple-Helix and Double-Helix Formation with Oligomers Counting Modified Pyrmidines Investors: Froehlert, et al

Attorney: Emma R. Dailey Phone No.: 215-568-3100 Sheet 8 of 29

Figure 6

Title: Enhanced Triple-Helix and Double-Helix Formation with Oligomers Containing and diffied Pyrmidines Inventor(s)—roehlert, et al Attorney: Emma R. Dailey Phone No.: 215-568-3100 Sheet 9 of 29

Figure 7

Title: Enhanced Triple-Helix and Double-Helix Formation with Oligomers
Contact Modified Pyrmidines
Invent (3): Froehlert, et al

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Title: Enhanced Triple-Helix and Double-Helix Formation with Oligomers Contain Modified Pyrmidines
Inventorio,: Froehlert, et al

Attorney: Emma R. Dailey Phone No.: 215-568-3100 Sheet 11 of 29

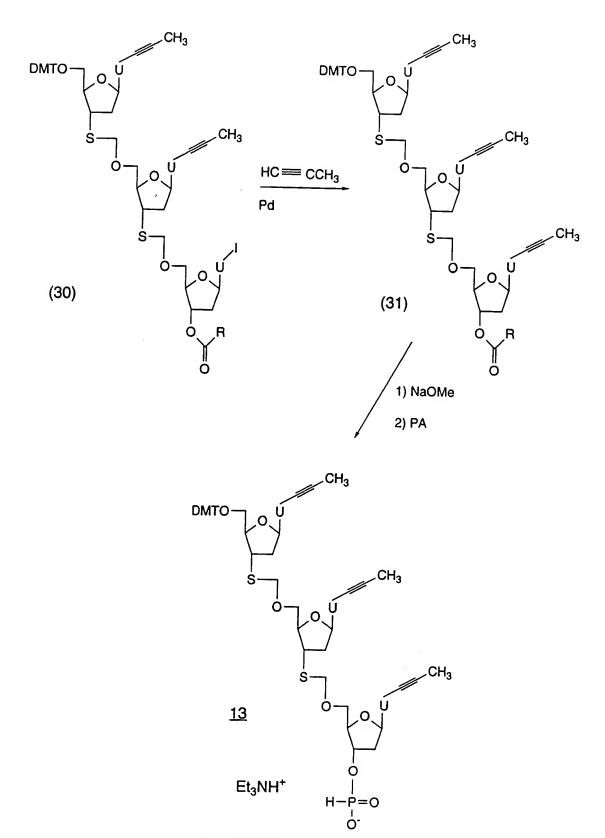


Figure 8-2

DEKCE 140 OF12-0143

Title: Enhanced Triple-Helix and Double-Helix Formation with Oligomers Contain and odified Pyrmidines

Inventor (5): Froehlert, et al

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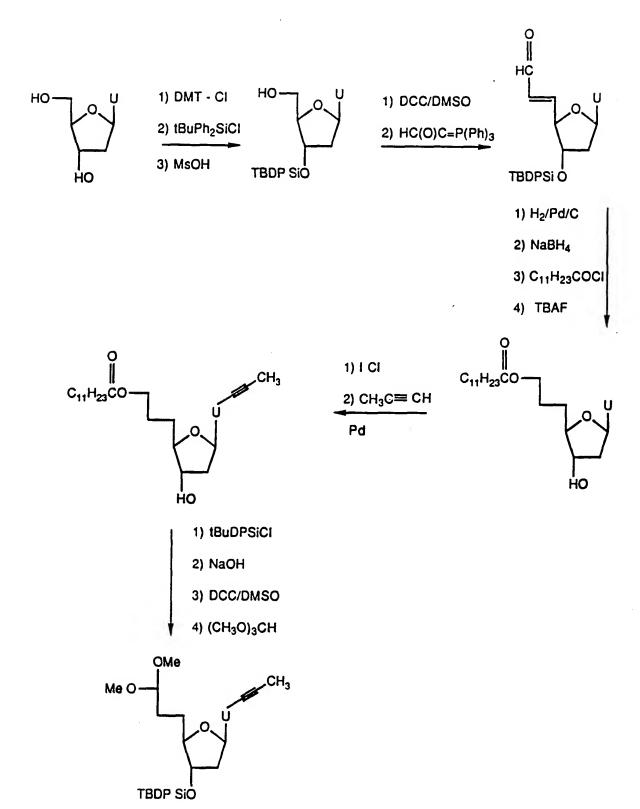


Figure 9-1

inale

5-(1-propynyl)-uridine

Figure 9-2

Title: Enhanced Triple-Helix and Double-Helix Formation with Oligomers Contain flodified Pyrmidines
Inventor(s): Froehlert, et al

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N,N-diisopropylamino-β-cyanoethoxyphosphine

N,N-diisopropylamino-methoxy-phosphine

N,N-diethylamino-methoxy-phosphine

N,N-diethylamino-β-cyanoethoxy phosphine

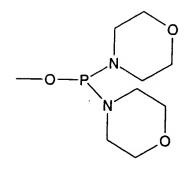
 $N\text{-}morpholino-\beta\text{-}cyanoethoxyphosphine}$

N-morpholino methoxyphosphine

Figure 10-1

Docker 149.. OL13-0143 Title: Enhanced Triple-Helix and Double-Helix Formation with Oligomers Containir dified Pyrmidines Inventor(s). roehlert, et al

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Bis morpholino-phosphine

N,N-dimethylamino- β -cyanoethylmercapto-phosphine

$$CH_3$$
 CH_3 CH_3 CH_3 CH_3 CH_3 CH_3 CH_3 CH_3 CH_3 CH_3

N,N-dimethylamino-2,4-dichlorobenzylmercaptophosphine

Bis(N,N-diisopropylamino)phosphine

Figure 10-2

sal.

DOCKEL 140 OF12-0142 Title: Enhanced Triple-Helix and Double-Helix Formation with Oligomers g Modified Pyrmidines

Inventor(s): Froehlert, et al

Attorney: Emma R. Dailey Phone No.: 215-568-3100 Sheet 16 of 29

2-chlorophenyl phosphate

4-chlorophenyl phosphate

2,4-dichlorophenyl phosphate

$$Z^1 = -H \text{ or } -N$$

2,4-dibromophenyl phosphate

X = O or S

R = H, NO_2 and CF_3

Figure 10-3

Title: Enhanced Triple-Helix and Double-Helix Formation with Olicemers Contain Codified Pyrmidines
Inventor(s): Froehlert, et al

Attorney: Emma R. Dailey Phone No.: 215-568-3100 Sheet 17 of 29

N,N-diisopropylamino-methylphosphine

$$-O-P$$
 CH_3
 CH_3

N,N-diethylamino-methylphosphine Title: Ephysiced Triple-Helix and Double-Helix Formation with Olympiers Contain Codified Pyrmidines
Inventor(s): Froehlert, et al

Attorney: Emma R. Dailey Phone No.: 215-568-3100 Sheet 18 of 29

Figure 11

Title: Enhanced Triple-Helix and Double-Helix Formation with Oligomers Containing I and ed Pyrmidines
Inventor(s): Froehlert, et al

Attorney: Emma R. Dailey Phone No.: 215-568-3100 Sheet 19 of 29

Figure 12-1

Title: Enter red Triple-Helix and Double-Helix Formation with Oligomers Contain Codified Pyrmidines
Inventor(s): Froehlert, et al

Attorney: Emma R. Dailey Phone No.: 215-568-3100 Sheet 20 of 29

Figure 12-2

Title: Enhanced Triple-Helix and Double-Helix Formation with Oligomers Containing the lifted Pyrmidines Inventor(s): Toehlert, et al

Attorney: Emma R. Dailey Phone No.: 215-568-3100 Sheet 21 of 29

Figure 12-3

 Title: Ephraced Triple-Helix and Double-Helix Formation with Olicemers Contain Flodified Pyrmidines
Inventor(s): Froehlert, et al

Attorney: Emma R. Dailey Phone No.: 215-568-3100 Sheet 22 of 29

Figure 13

 Title: Enhanced Triple-Helix and Double-Helix Formation with Oligomers Containing Name 2d Pyrmidines
Inventor(s): Froeflert, et al
Attorney: Emma R. Dailey Phone No.: 215-568-3100 Sheet 23 of 29

$$HO \longrightarrow HO$$
 $HO \longrightarrow HO$
 $HO \longrightarrow HO$

Figure 14

HO-

ΗÒ

Figure 15

SnMe₃

Pd

HO-

HO

ank

Title: Eplanced Triple-Helix and Double-Helix Formation with Olimers Contain Modified Pyrmidines Inventor(s): Froehlert, et al

Attorney: Emma R. Dailey Phone No.: 215-568-3100 Sheet 25 of 29

Figure 16

Ò-

Et₃N⁺H

Title: Pshanced Triple-Helix and Double-Helix Formation with Oligomers Confered Modified Pyrmidines Inventor(s): Froehler, et al

Attorney: Emma R. Dailey Phone No.: 215-568-3100 Sheet 26 of 29

Figure 17-1

Title: Enbraced Triple-Helix and Double-Helix Formation with Ol Contain Contai Contain odified Pyrmi Inventor(s). Froehlert, et al Attorney: Emma R. Dailey

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Figure 17-2

Title: Enhanced Triple-Helix and Double-Helix Formation with Contain Lodified Pyrmidines
Inventor(s): Froehlert, et al

Attorney: Emma R. Dailey Phone No.: 215-568-3100 Sheet 28 of 29

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Figure 17-3

Title: Enhanced Triple-Helix and Double-Helix Formation with Oligovan Containing Fried Pyrmidines Inventor(s): Assehlert, et al Attorney: Emma R. Dailey Phone No.: 215-568-3100 Sheet 29 of 29

DMT-O-Ò. Et₃NH⁺ DMT-O DMT-O-NR В RN Q. Et₃NH⁺

Figure 18

Et₃NH⁺

 $R = H, CH_3$